

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1 - 102 are in this Application. Claims 2 – 35, 40 – 46, 50 – 75, 78, 79, and 83 – 102 have been withdrawn from consideration. Claims 1, 36 – 39, 47 – 49 76 – 77, and 80 - 82, have been rejected under 35 U.S.C. § 103.

35 U.S.C. § 103 Rejections

Kitada US 6,798,403 teaches an ultrasonic system for position detection but lacks a continuous waveform or modulation of data onto the continuous waveform. Puma US 5,339,259 also teaches an ultrasonic system for position detection and adds to Kitada the use of a continuous ultrasonic waveform. However Puma detects position using intrinsic properties of the waveform and does not modulate data or anything else onto the waveform, as will be explained in greater detail below.

Modulation and Citation to Puma.

Examiner acknowledges that Kitada fails to teach that the waveform is *continuous* or that there is any modulation of a continuous waveform, and on this point relies on Puma US Patent No. 5,339,259, pointing in particular to Fig. 2 thereof.

Puma indeed teaches a continuous waveform. However in Puma the position is measured using *intrinsic properties* of the continuous waveform. In this respect applicant points to Fig. 2 item 230 Fringe counter, item 240 Fringe interpretation counter, item 202 Fringe count latch, item 200 Fringe processor. Puma uses *interference fringes*, which are an intrinsic property of the continuous waveform, in order to determine position. His motivation for doing so is that the interference fringes give a granularity which is smaller than the wavelength of the ultrasound continuous wavelength.

It is stressed, fringes are an *intrinsic property* of the waveform and no data is *modulated* onto the waveform in Puma. The waveform in Puma remains a pure waveform and at no stage becomes a modulated waveform, contrary to the requirements of the claim.

As the Examiner will be aware from High-School physics, when two waveforms interfere so that interference fringes are generated, the interfering waveforms themselves do not change, and once passed the region of interference the unmodified original waveform can be found.

The presently claimed invention requires not merely a continuous waveform, but that data is *modulated* onto the continuous waveform. Modulation involves *change* of the waveform. The position is then determined by decoding the modulated data.

That is to say the claim requires *two separate ingredients*, a continuous waveform is the first ingredient and a modulation of the continuous waveform to carry data is the second ingredient.

The claim wording requires:

"said continuous waveform including a signal comprising positional information *modulated* thereon"

and Puma fails to meet this claim wording since all he has is a continuous waveform with *intrinsic* positional information. In Puma no modulation occurs.

The modulation is further defined in terms of being reversible, namely:

such that said continuous ultrasonic waveform is decodable to extract said positional information, therewith to fix said attained position.

That is to say the modulation of the present claim is defined as including an act of adding the positional information to the continuous ultrasonic waveform in such a way that the positional information can subsequently be removed by demodulation.

The present claim thus contrasts with Kitada, who merely manipulates the ultrasonic waveform. There is *no insertion of the positional information onto the waveform* through these manipulations, and there is certainly *not any possibility of extracting the positional information through a reversal of these manipulations*. Likewise with Puma, there is *no insertion of the positional information onto the waveform*. Although it is accepted that in Puma there is extraction of the positional information, it still does not meet the claimed limitation. The claim requires that the *extraction* is of "*said positional information*", namely that which is modulated earlier in the claim, and Puma does not modulate positional information onto the continuous waveform.

Fig. 2 of Puma, to which the Examiner refers, shows clearly Puma's extraction stage, and it is abundantly clear that what is extracted is *intrinsic information* that emerges from the forward and reflected carrier waves, that is to say interference fringes.

Furthermore neither Puma nor Kitada teach

"a detector arrangement for detecting *said continuous ultrasonic waveform comprising said modulation*,"

Whilst both Puma and Kitada teach detection of an incoming ultrasonic signal and in Puma the signal is continuous, neither teach that the continuous signal detected comprises a modulation.

Thus the combination of Puma and Kitada fails to teach or hint at the claimed combination.

Indeed reviewing all the citations provided by the Examiner reveals that it was not understood in the prior art that ultrasound could provide continuous waves which could be used as carrier waves on to which data could be modulated.

Applicant thus remains of the view that it is new to provide position detection using *an ultrasound carrier wave which is continuous and onto which data (the position information) is modulated by reversible manipulations of the carrier wave*. As was pointed out in the previous response, such has been done for many years with radio signals but applicant is the first to use a carrier and modulation with an *ultrasound* signal, certainly the first to do such a thing for ultrasound based positioning. All existing ultrasound positioning systems use discontinuous pulses, which themselves are the positioning information. Kitada is a typical example of such a thing. Puma differs from the conventional art in that he uses a continuous waveform, but he uses *the intrinsic properties of the waveform* and does not modulate *data* on to the continuous waveform.

In Puma, in the passage beginning in column 5 line 65 he discusses modulating a low frequency signal onto a high frequency signal. He does this so that a phase difference can be measured between the high and low frequency signals.

However all Puma is proposing is taking two featureless waveforms and measuring a phase difference between them, and this still constitutes obtaining the position from *intrinsic properties* of the waveform. Puma still fails to provide

"said continuous waveform including a *signal comprising positional information* modulated thereon",

since a *featureless* waveform cannot be "a signal comprising information". That is to say a featureless waveform, if taking a broadest *possible* interpretation, and applicant does not accept that such is a broadest *reasonable* interpretation, could at most be considered a signal, or its very presence could at most be considered to be a single bit of information, but it cannot pass the requirement to have two parts, namely it cannot be a signal *comprising* information.

The remaining claims are believed to be allowable as being dependent on allowable main claims.

The independent claims are believed to be generic to all of the species, and thus the withdrawn claims may be examined.

In view of the above amendments and remarks it is respectfully submitted that the rejected claims are now in condition for allowance, and that the withdrawn claims relating to the non-elected species may be restored to the application. A prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,

/Jason H. Rosenblum/

Jason H. Rosenblum
Registration No. 56437
Telephone: 718.246.8482

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